Convection, Lightning, and Stratospheric Influences

- Review status of current analysis topics
- Organize topics into themes
- Resolve overlaps
- Evolve overlaps into collaborations
- Identify problems and gaps
- Identify potential manuscripts

Topics Discussed

Convection

Age of air since convection/lightning

Convective influence calculations based on trajectories and IR imagery (Pfister)

Chemical ratios (e.g., NOx/HNO3) (Cohen, Pickering, Porter)

Hydrocarbon tracers of boundary layer air (Blakes)

Comparison of techniques

Vertical redistribution

Convective transport of HCHO (Fried) ***

H2O2/CH3OOH ratios (Heikes)

CO, PAN, NO2, etc. (peak at 8-10 km) Effects on NOy budget (Sachse, Singh, Cohen, Hudman)

O3 – no real UT min seen (Browell, Avery)

CO2 (BL min vs. max) (Vay) – biogenic compounds also transported

Topics Discussed

Convection (continued)

Photochemistry/Aerosol Processes Downwind

P(O3) from box model calculations along flights (Crawford, Cohen)

HOx budget as affected by peroxides, formaldehyde (O'Sullivan, Heikes, Fried, Brune)

New particle production in convective outflow (Clarke, Anderson) ***

Regional O3 enhancement (Li, Pickering)

Convective Transport Processes

Convection embedded in WCBs (Fuelberg, Kiley)

Role of convection in Asian outflows (Jaeglé, Liang)

Evaluation of parameterized convection in CTMs (Pickering, Pfister, Hudman) GEOS-4 RAQMS (Pierce et al)

Effective convective turnover time for UT (Cohen)

Flights affected: July 6, 8, 10, 12, 18, 25 Aug 11

Topics Discussed

Lightning

NLDN data – how can IC flashes be accounted for? (Pickering)

Los Alamos Sferics Data (Pickering, Porter)

Our data enables us to distinguish lightning generated from advected NOx using boundary layer tracers and NOx (Cohen et alia)

Lightning influence calculations (first encounter versus longer-term accumulations of flashes along back trajectories) (Pickering, Porter)

Vertical profile of lightning NOx downwind of storms (Pickering, Porter, Brune, Cohen, Chatfield)

Age of air since lightning influence (Cohen, Porter)

More detailed analyses for storms near DC-8 flight track – especially if Huntsville LMA data are useful (Pickering)

Cloud resolving modeling aimed toward deducing NO production per flash (Pickering, Brune, Cohen, Porter)

Testing of lightning parameterizations in CTMs (Pickering, Brune, Cohen, Hudman)

Topics Discussed

Strat-trop Exchange

Diagnosis from IONS soundings (Merrill, Thompson)

Diagnosis from Be-7 (Dibb) ***

Synoptic/mesoscale mixing/folding events

- O3 observations and model calculations (Pierce, Thompson)
- PV analyses (Fairlie, Thompson, Merrill)
- Water vapor (Moody)

Quantifying STE in convective events? (Hitchman, Pfister, Pickering)

Convection into an STE environment (Pierce, Moody)

Manuscripts